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COLORADO BIOLOGICAL
ASSOCIATION

Report Nos. 1-12

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FIRST REPORT

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

THE ASSOCIATION.

This Association, founded in the fall of the present year, has for its objects the acquisition and difusion of knowledge relating to all forms of life, whether animal or vegetable, existing within the boundaries of this state. From a scientific point of view, the work that has been done and is being done by its members is of by no means without value, and tends constantly to a better understanding of the Natural History of Colorado; while, at the same time, points of economic and popular interest are not to be neglected, and especially does it seem desirable to give full and precise information respecting those animals, birds, insects and plants which directly or indirectly affect agricultural interests.

This being so, the question naturally arises, by what means can such information be best and most easily and quickly conveyed to those interested? The obvious reply seems to be—since newspapers exist for diffusion of all news that concern the people, they are surely the proper medium for such matter, and it is therefore with pleasure that we announce that an arrangement has been made with the editor of the CUSTER COUNTY COURANT, for the publishing of the reports issued by the association on matters of general interest in his paper, with a separate edition of each to be sent to the members resident in other parts of Colorado, in other states, and in Europe.

That the reports issued by the Association may be as complete and as useful as possible, it is particularly requested that information shall be sent in respecting all visitations of injurious insects, or any matters requiring the attention of the association. Such information should, whenever possible, be accompanied by specimens. In return all possible information will be supplied with as little delay as may be, and if necessary, remedies suggested, and any specimens sent in will be duly named and commented upon. Specimens and notes may be sent to the secretary, T. D. A. Cockrell, at Westcliffe, Colorado, who will give further information about the Association to any who are interested or think of becoming members of it.

INJURIOUS INSECTS OF CUSTER COUNTY.

First, The Alfalfa Web worm. (Eurycreon)—Early in June of the present year some of the alfalfa crops in Wet Mountain Valley were found to be very seriously injured by a kind of caterpillar, or "web-worm." So ser-

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ious and so sudden was the onslaught that it was suggested that they might be the well known "army worm" of the eastern and southern states, but this was not the case. Thanks to the kindness of Mr. Frere, facilities were afforded for a careful examination of a badly damaged crop, where the caterpillars were still at work in immense numbers. They attacked the young alfalfa plants, spinning a web over the leaves, in which they lived. They greedily devoured the young leaves, and not only this, but appeared to injure the whole plant attacked, so that it withered away. In this way large tracts of what might have been excellent alfalfa were reduced to a condition of complete worthlessness, and contrasted strongly with portions of the same field, which were as yet untouched. These "web-worms" are somewhat under an inch in length, the head is pale olive brown, or sometimes almost black, and the body dark grey, with three pale bands, one on the back and one on each side, while on each side of each segment there are three raised black spots, arranged triangularly. In some specimens the band on the back is split into two lines, while in others it is obsolete. When disturbed they are very restless, and crawl rapidly backwards or forwards to escape. When full grown, these caterpillars turn to a chrysalis, which ultimately becomes a rather small moth with rather elongated wings, which in turn lays eggs which give rise to a fresh generation of caterpillars. This pest is very closely allied to, though apparently distinct from, the injurious "garden webworm" (Eurycreon rantalis) which has been especially harmful to all kinds of garden and field produce in Kansas, Nebraska and Texas during 1888, and was very destructive also in Colorado, Missouri and Indian Territory in 1885.

The best remedy known for this latter insect is an arsenical poison, such as London Purple and Paris Green, which may be applied dry if the area is limited, or in larger quantities and over big areas by mixing the poison in water, say a table-spoonful of Paris Green to half a gallon of warm water, and apply it by means of a nozzle. This, however, could scarcely be practiced in the case of alfalfa, for although it would most certainly kill the alfalfa web-worm, it would be dangerous on a food crop of this kind owing to its poisonous properties. The best plan, indeed, seems to be the one hit upon by Mr. Frere--abundant irrigation. It appears that this method at least diminished considerably the number of caterpillars, and checked their ravages, while the damaged alfalfa plan would begin gradually to recover c

being freed from the attack.

NATURAL HISTORY NOTES.

We are informed on apparently good authority that the wild Mountain goat used to exist in Middle Park. Has any one seen them there of late years, or in any other part of the state?

Mr. Coverly reports a number of hybreds between the Grey wolf and the dog, as existing on Piney River, in Eagle county. This cross (Canis Occidentalis x familiaris) is not a common one, so the occurrence of several in a wild state is of great interest.

Varieties of the black tailed deer are not common, but a perfectly black example is reported this fall from Piney River, but it is said that an albino was found some years ago near Canon City.

It is a much disputed point whether or not the genuine Silver fox (the skin of which is worth over $50) is found in Colorado. We are assured that a specimen was taken in Gilpin county, but it is quite a question whether the Cross fox was not mistaken for it.

Wolverine are probably not so rare in Colorado as has been supposed. Information has just been received of their occurrence in Gilpin and Eagle counties.

Mr. W. C. Roby sends a specimen of "club moss" (Lycopodium annotinum) from Holy Cross, Eagle county, which is a new locality for it. The yellow spores of this plant are used for making "artificial lightning." If blown into the air they form a fine dust, which, on being ignited, goes off with a flash.

Mr. F. Hamp informs us that he found a white-flowered specimen of the wild flax (Linum perenne) in Pueblo county. It is not a common variety in Colorado, although the blue flowers of this plant are common and conspicuously beautiful in summer time in many parts of the state, including Custer county. In parts of British America the white variety is said to be the ordinary form.

We recently found eighteen species of shells in the refuse thrown up by Muddy Creek, at Kremmling, in Grand county. At least one of them is new to the State fauna, and several have not been found before in Grand county.

A Mirage was seen at sun-set on Saturday, the 8th inst. The trees along Swift creek appeared greatly elongated and twice their natural size, while the distant prairie and horizon appeared to be in a wave-like motion.

The fungus known as ergot was found on a wild grass by Short Creek, Custer county, this year, but not in any great quantity. If it is much eaten by cattle it causes gangrene of the feet, known as "ergotism."

Smut (another parasitic fungus) appears to have been less prevalent this year than last in Wet Mountain valley,

at least it has been so in the neighborhood of Swift Creek. Probably threshing operations, especially if carried on while a breeze is blowing, tend greatly to disseminate the spores of this fungus and assist its increase. Generally speaking the oat crop seems to suffer more than the wheat.

A NEW BEETLE.

The number of species of animals and plants is so great, that it becomes a matter of great difficulty often to ascertain whether or not a species has been described and named. Mistakes occur every day, in which previously described species are re-named in ignorance of the name already given, and the synonomy thus created adds greatly to the complications of biolog ical science. Now according to the rules of scientific nomenclature, names published only in a newspaper do not hold good, and we therefore deem it expedient in the case of apparently new species and varieties which are discovered from time to time in Colorado, to "publish the banns" so to speak, in the CUSTER COUNTY COURANT, and then if nobody sees "due cause or impediment why these names should not be attached to these species in scientific nomenclature," they can be duly published in one of the specially scientific magazines later on. This prefaced, we give the description of a minute beetle of which two specimens were found near Swift Creek Custer Co. in the early part of the present year. One of the specimens was sent to Prof. C. V. Riley, the U. S. Entomologist, who states that the species is undescribed.

Longitarsus nitidellus, Ckll., n. sp. Colour, very dark brown or brown-black; legs, tawny; head, black; eyes, large; antennæ, brown, yellowish at base, ~~nine~~ jointed, the terminal joints slightly hairy, but not enlarged. Thorax nearly smooth, black, shiny, about as long as broad. Scutellum black, smooth. Abdomen very dark brown, the terminal segment hirsute-pubescent. Legs yellowish-brown, shiny, with short hairs, the posterior pair with swollen, dark brown thighs, sparsely hirsute with short hairs. Elytra dark brown, elongate, with nearly parallel sides and blunt apices, shiny, thickly but minutely punctured. Length 2½ millimetres.

T. D. A. C.

C. V. RILEY,
Washington,
D. C.
PC. 64/2

SECOND REPORT

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

We hope shortly to issue a report, in pamphlet-form, giving an account of work done, and also a list of members. In the meanwhile, we publish the names of those who join from week to week.

(18.) H. W. Nash, P. O. box 734, Pueblo, Colorado.

(19.) Geo. Dimmock, Editor of "Psyche," Cambridge, Massachusetts.

(20.) A. Sv. Bjornson, M. D. Westcliffe, Colorado.

(21.) Grant Turner, Editor of the CUSTER COUNTY COURANT, Silver Cliff, Colorado.

The Buffalo Gnat. (Simulium.)—The U. S. Entomologist, in his report for 1886, writes as follows: "For many years past one of the greatest insect foes the stock-raisers of the lower Mississippi valley have had to contend with has been the so-called Southern Buffalo Gnat. This insect is a small fly, closely related to the well-known "Black Fly" of the north, to the famous "Columbacz Gnat" of Hungary, and to other less known but as noxious specious of the genus Simulium, found abundantly in Lapland, Brazil and Australia. These flies swarm in certain seasons in immense numbers, and by their bite, multiplied a thousand fold, cause great destruction among mules, horses, cattle, hogs, sheep and poultry." This report of Prof. Riley's, fortunately for us, refers to a species different from ours, and far more injurious. Yet we have, in the mountains of Colorado, a species of Simulium which attacks horses, especially where, from one cause or another, the hair has deen partially rubbed off, or any slight injury involving abrasion of the skin has occurred.

These gnats may be distinguished from the common mosquito, which they somewhat resemble, by their shorter form, broader and rounder wings, and especially their large and almost humped thorax, looking something like the hump of a buffalo when viewed sideways—whence their name.

They may be called the mountain buffalo gnat, to distinguish them from the Southern species. Mr. Roby, of Holy Cross, Eagle county, sent a wing of what he writes is there called the "Red mosquito," it appears, from the wing, to be a Simulium, but as our "Mountain buffalo gnat" is not red, it is presumably a different species from that.

Accompanying the Mountain buffalo gnat in Custer county, we find a smaller gnat, with wings which are partly blackish or dark grey; these little gnats are more numerous than the buffalo gnats, but seem unable to to puncture through the skin and hair of a horse for themselves, so they wait until the buffalo gnats have had their fill, or a sore spot is formed, and assemble as close as they can pack to suck at the wound, causing irritation and making matters worse. Specimens of this small gnat were sent to the Department of Agriculture at Washington, but could not be identified Scientifically; we may conveniently allude to them as the "wound gnat."

As regards remedies and preventives; in the Mississippi valley, when the southern species appears in such immense numbers, very heroic methods have to be employed, even to the extent of administering Carbonate of ammonia and whisky every three or four hours to the bitten animals until they recover. Probably the best precautions to be employed here is to rub some kind of grease or oil over bare or abrased spots; Cotton seed oil, oil of tar, fish oil, crude coal oil, kerosene oil, kerosene mixed with axle grease, and other like substances are recommended. To be effective, the grease must be used at least twice a day, because as soon as its odor disappears it becomes inoperative. If the gnats are very numerous, oil of tar may be washed all over animals subject to their attacks, as often as seems necessary.

The buffalo gnat spends its early life in the water. The parent fly deposits her eggs close to the margin of small and rapid creeks, and the young larvæ or grubs, hatching out, immediately take to the water. These larvæ fasten themselves to submerged sticks, dead leaves &c., especially where the water is running fast. They live upon minute Crustaceans and other microscopical animals, which are caught by fan-like organs, the motion of which create currents of water towards the mouth of the larvæ, and so sweep in whatever may be floating by. When fully grown, the larvæ descend towards the bottom of the stream, where they form their cocoons, from which the perfect flies eventually emerge. The gnat, on leaving the cocoon, according to Riley, "pops up to the surface of the water like a cork, runs a few inches over the water and darts away with great swiftness."

THE BUTTERFLIES OF COLORADO.

COLIAS EURYTHEME, is the name of the medium sized orange butterfly that is so common in Custer county in the summer time. It has two generations in a year, and it is a most remarkable fact that the orange generation of the summer appears to alternate with a generation of pale sulphur butterflies, which appear in late autumn and early spring. These forms are called intermedia (the orange one) and autumnalis (the sulphur one) respectively. It was supposed that no other form except a nearly white variety of the female occurred here, but we now find that there is a short flight of a different sulphur variety, called eriphyle, in September.

It seems, in fact, that there are two distinct sets of these butterflies, which do not interbreed. Set 1 comes from the autumn and early spring examples of autumnalis, which lay eggs and go through their transformations to produce late summer intermedia, the progeny of which pass the winter as adult or nearly adult larvæ, (or if the weather is mild partly give rise to the late fall autumnalis,) and produce autumnalis again in the spring. Set 2 comes from the late spring and early summer intermedia, which produce as a second generation the September eriphyle, the caterpillars arising from which pass the winter quite young, and eventually become the first specimens of intermedia appearing the next year.

Most of our common butterflies are familiar to all, but we venture to

think that very few know much of their life history and peculiarities, or even their names. We therefore propose to give a series of short articles on those which are most often noticed, or are specially worthy of notice, in the hope that it may arouse a little interest in these beauties of nature.

NOTES.

Mr. T. Charlton, of Westcliffe, has a most interesting collection of fossils which he found in the Huerfano, and about which he will probably have something to say in our columns later on. These fossils are of Marine origin, and are relics of the time when the sea washed where Colorado now is. Among them are teeth of at least two genera of sharks-(Lamna and another.)

It is a curious and interesting fact that the chrysalids and cocoons of certain butterflies and moths vary in color according to the situation in which they are found, presumably for the sake of protective resemblance. Mr. J. Jenner Weir, writing from Beckenham, England, relates an experience of his with Vanessa urticæ, a butterfly much resembling Vanessa milbertii of Colorado, as follows: "I made a little experiment lately with some larvæ of Vanessa urticæ: they were placed in a rose arbor, of course in the shade; the chrysalids were nearly black, with but little gold marking. I then removed the remaining caterpillars, cage and all, to my greenhouse; the chrysalids produced were very light, pinkish and golden marked; the difference of light appeared sufficient to cause this difference of tint."

Mr. H. W. Nash, of Pueblo, sends us a list of sixteen species of butterflies which he obtained at Bonanza, Saguache county, in 1880. The list includes Colias meadii, Erebia epipsodea and other interesting species, all of which are also known from Custer county. The only butterfly known to us from Saguache county which is not in Mr. Nash's list, is Lycœna rustica, which we took in Cottonwood gulch last year.

It is not generally known that a kind of tobacco plant (Nicotiana) grows wild in Colorado. We obtained a specimen on the Sangre de Cristo Range, near Swift Creek, last year.

The common harebell (Campanula rotundifolia,) although of deep blue color, often turns white in the process of drying for the herbarium. There is, however, a variety with naturally white flowers, and it is a most curious circumstance, first noticed by Mrs. M. E. Cusack, of Wet Mountain valley, that the flowers of this white variety turn blue in drying. That this is actually so cannot be doubted, but at present it seems wholly inexplicable, and therefore the more interesting.

Mr. Charles F. Morrison writes "Mr. T. Martin Trippe of Howardsville in a letter received adds the Roseate Spoonbill (Ajaja ajaja) to the birds of Colorado; a female in full spring plumage having been taken alive at Silverton, San Juan county, last June." This is indeed a noteworthy addition to the avifauna of the state, though no doubt it was only a casual visitor

Most people would not suppose that the green scum of irrigation ditches, creeks &c. had any botanical interest. Nevertheless, a microscopical exami-

nation of specimens of this "scum" collected in Custer county, which has been kindly made for us by the well-known algologist, Mr. F. Wolle, of Bethlehem, Pennsylvania, has resulted in the discovery of twenty-eight species of fresh water algœ.

The "horned toad" is a well known inhabitant of Wet Mountain valley. As a matter of fact, it is not a toad at all, but a kind of lizard. Its scientific name is Phrynosoma modestum. Like most other lizards, it lives upon insects.

Those desiring to become members of the association or otherwise interested, can obtain full particulars from T. D. A. Cockerell, Westcliffe, Colorado. The membership subscription is one dollar per annum. Copies of these reports will be sent to members monthly. Those desiring to receive them weekly may do so by sending forty cents to cover cost of postage.

T. D. A. C.

THIRD REPORT

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(22.) Wm. H. Ashmead, Jacksonville, Florida.

INJURIOUS INSECTS OF CUSTER COUNTY.

The Cabbage Aphis, (Aphis brassicæ.)—Quite frequently, on the leaves, and especially the outer leaves, of cabbages, are found masses of dull greyish Aphides or plant-lice, crowded together as close as possible, and living upon the juices of the plant. If one of them is examined carefully, it is seen to have a long, oval body, in color dull greyish-green, but appearing whitish because covered with a white mealy substance, which is readily removed by a drop of alcohol. The legs and head are dark grey-green—in alcohol they look black. Most of these plant-lice are wingless, but here and there a specimen will be found having wings, which are transparent, with conspicuous veins.

The rate at which Aphides multiply, is something prodigious: Dr. C. V. Riley has calculated that a single female of the hop-aphis may give rise, in a single summer, to trillions of these insects. He writes: "Each parthogenetic female is capable of producing on an average one hundred young, at the rate of one to six, or an average of three per day, under favorable conditions. Each generation begins to breed about the eighth day after birth, so that the issue from a single individual easily runs up, in the course of the summer, to trillions, the issue from a single stem-mother may, under favoring circumstances, blight hundreds of acres in the course of two or three months."

This refers to the hop-aphis, but probably the cabbage aphis is not much less prolific, and did not nature herself provide a remedy there can be no doubt the cultivation of cabbages would become impossible, owing to the ravages of these Aphides. There are several parasites which attack the cabbage aphis, and so effectually keep it in check; and although none of these have yet been observed in Custer county, there can be no doubt that some occur, and will be discovered as soon as a little patient attention is given to the matter. In the eastern states and in Europe, where the cabbage aphis is also abundant, the most note worthy of these parasites is called Trionyx rapæ, a small ichneuman fly which lays its eggs, one in the body of each Aphis, and from these come grubs, which live upon the juices of the aphides, and eventually turn to flies, which es-

cape, leaving only a brown hard shell where once was an aphis. In Florida, other parasites of somewhat similar habits have been bred from cabbage aphides, and called respectively Allotria brassicæ, Encyrtus aphidiphagus and Pachyneuron aphidivora.

Very frequently ants will be seen running round a colony of plant lice, and it is known that they are there for the purpose of collecting the sweet excretion of the aphides, of which they are extremely fond. Charles Darwin has written an interesting account of this as follows: "One of the strongest instances of an animal apparently performing an action for the sole good of another, with which I am acquainted, is that of aphides voluntarily yielding, as was first observed by Huber, their sweet excretion to ants: that they do so voluntarily, the following facts show. I removed all the ants from a group of about a dozen aphides on a dock plant, and prevented their attendance during several hours. After this interval, I felt sure that the aphides would want to excrete. I watched them for some time through a lens, but not one excreted; I then tickled and stroked them with a hair in the same manner, as well as I could, as the ants do with their antennæ, but not one excreted. Afterward I allowed an ant to visit them, and it immediately seemed, by its eager way of running about, to be well aware what a rich flock it had discovered: It then began to play with its antennæ on the abdomen first of one aphis and then of another; and each, as soon as it felt the antennæ, immediately lifted up its abdomen and excreted a limpid drop of sweet juice, which was eagerly devoured by the ant. Even the quite young aphides behaved in this manner, showing that the action was instinctive, and not the result of experience. It is certain, from the observations of Huber, that the aphides show no dislike to the ants; if the latter be not present they are at last compelled to eject their excretion. But as the excretion is extremely viscid, it is no doubt a convenience to the aphides to have it removed; therefore they probably do not excrete solely for the good of the ants."

As to remedies for the cabbage aphis, fumigation with tobacco smoke has been recommended, but is not of much practical use. A strong solution of whale-oil soap is said to be very effectual, while one writer recommends sprinkling with soap-suds treated with quassia. Dr. Riley considers that the application of kerosene emulsion will prove the most satisfactory remedy.

Many other species of plant lice occur in Custer county, such as the Quaking Asp Aphis, the Bigelovia Aphis, and the Gymnolomia Aphis—

of these we shall probably have more to say another time.

CAN WE GROW TOBACCO.

Last week we mentioned the occurrence of a wild species of Nicotiana near Swift Creek, and this suggests the enquiry, if tobacco will grow here wild, why not cultivated? In answer to this comes very opportunely the report of experiments with tobacco, by Prof. J. Cassidy, in the 4th Bulletin of the Agricultural College at Fort Collins. Experiments were conducted at Ft. Collins for two years to try the value of tobacco as a farm crop in this state, and so far as they go, they seem entirely favorable to the opinion that tobacco will succeed here. Eighteen varieties, which are fully described in the report, were grown in 1887, and all of them ripened thoroughly before the end of August. Of these, the White Burley variety was found easiest to manage and earliest to mature, while the General Grant, Connecticut Seed Leaf, Vuelta Abajo and Missouri Broad Leaf also did very well. The different varieties were sown in a moderate hot bed on March 26th, and transplanted to the open ground May 25th. With regard to soil, it is stated that "the finest tobacco is raised on light, rich soils. Our unmanured upland soils will grow a fine leaf of any of the stronger growing varieties. The deeper the plowing, the larger the crop."

As regards irrigation, once is thought to be sufficient at Fort Collins. "No crop is so effectually destroyed on wet lands as tobacco, and none is so little affected by drouth." After being harvested, the tobacco is hung up in a barn to cure. The process of curing, stripping, sweating and boxing is fully described in Prof. Cassidy's report, which should be read by anyone interested, and we have only to quote from a letter written to Prof. Cassidy by Mr. Fritz Thies, a cigar manufacturer of Denver, to show the opinion of the trade on Colorado-grown tobacco. The letter is as follows: "The Havanna Seed-leaf samples left with me have been thoroughly examined and put to the usual test. The cigars made from the leaf prove to be supesior to anything grown in those districts which are supposed to yield our finest native-grown Havanna Seed leaf. Other tobacco experts who have tested the cigars made from your samples, say the flavor of the cigars will compare very favorably with the Havanna-grown leaf. I have no doubt but a large demand exists at the present time in Colorado for tobacco of this class. The market will by no means be confined to our home demand."

In view of this very favorable report, will not some of our ranchmen try a small experimental crop next

year?

As stated by Dr. Geo. Vasey, several species of wild tobacco were cultivated by the Indians. One species, Nicotiana rustica, was cultivated in New Mexico and Arizona, while another, Nicotiana quadrivalvis, was cultivated from Missouri to Oregon. Nicotiana attenuata is stated by Porter and Coulter to grow wild on Gray's Peak, Colorado.

NOTES.

We do not know all about our Mammals yet. Only last year Dr. C. H. Merriam described a new species of mouse, which he calls Hesperomys anthonyi, from New Mexico, and this year he has described a new fox (Vulpes macrotis) from Southern California. Dr. Merriam has very kindly promised to name any mammals and birds that we may send to him for the purpose, and we shall therefore be very glad to receive skins of small animals and birds to forward to him. In the case of mammals, the skull is necessary as well as the skin.

The coyotes are reported to have killed a number of chickens on Swift Creek recently.

In the October number of the "Journal of Mycology" Messrs. Ellis and Everhart describe a new species of fungus from Colorado, and name it Dermatea pruinosa. It was found on dead Quaking Asp bark, in Custer county, this year. Several other apparently undescribed fungi have been met with in Custer county, for which manuscript names have been given as follows:—Agaricus (Inocybe) occidentalis, Ckll., Lycoperdon occidentale, Ell. & Ev., Mycenastrum fuscum, Ckll., Puccinia bigeloviæ, Ell. & Ev., and Uromyces castaneus, Ell. & Ev. The last mentioned was found on grass near Red Creek, in the eastern part of the county, but all the others are from near Swift Creek. Puccinia bigeloviæ was also found at Canon City.

A grasshopper belonging to an undescribed species of Melanoplus, was found near Short Creek this fall.

Mr. W. H. Ashmead has been good enough to examine a collection of Ichneumon-flies from western Custer county, and among them he finds thirteen new species, which he proposes to name as follows:—Ischnocerus incertus, Catalytus americanus, Meteorus nigristigmus, Idiasta americana, Pentapleura cockerellii, Lysitermus coloradensis, Praon politus, Rhopalicus coloradensis, Meraporus monticola, Psilomma coloradensis, Xenotoma macrodyctium, Miota glabra, and Anectata polita. With regard to the Peutapleura cockerellii, we think it better as a rule not to dedicate species after individuals, and therefore suggest that the name be changed to Pentapleura alticola.

Dr. Geo. H. Horn reports an unnamed species of Phyllotreta in a collection of small beetles from western Custer county.

Mr. Wm. Beutenmuller of New York writes us concerning a new species of moth from Colorado, which he proposes to call Psecadia albicostella. This is the fourth species of this genus known from Colorado.

T. D. A. C.

C. V. RILEY,
Washington,
D. C.

FOURTH REPORT

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(23.) Rev. Geo. D. Hulst, Editor of "Entomologica Americana," 15 Himrod street Brooklyn, N. Y.

(24.) Lord Walsingham, M. A., F. R. S., Merton Hall, Thetford England.

THE LIBRARY.

We have to acknowledge with thanks the volumes of "Ornithologist and ologist" for 1887 and 1888 from Mr. Charles F. Morrison; and copies of 36 valuable papers from Prof. A. S. Packard, M. D. In the library catalogue which we hope to publish later on, these and other works in the possession of the Association will be enumerated in detail. Thanks are also due to the Rev. Geo. D. Hulst, for a MS. list of the Sphingidæ, Catocalæ, Geometræ, Pyralidæ, and Tortricidæ, of Colorado, compiled from published records, and to Mr. Wm. Beutenmuller for notes on the Lepidoptera recorded from Colorado in Bull. VI of Haydens survey.

INJURIOUS INSECTS OF CUSTER COUNTY.

The Tent Caterpillar (Clisiocampa.)—The tent-caterpillar of Custer county, is perhaps not to be considered an injurious insect at all, since its attacks are apparently confined to the quaking asp trees, and are not so serious as to attract much notice. It has been reported, however, that in past years caterpillars have done much damage to the quaking asps, and it is by no means improbable that these were tent caterpillars, though no positive evidence is forthcoming. Nevertheless, in other parts of the country, where fruit trees are grown, these same tent caterpillars are a serious pest to be reckoned with, and require to be constantly destroyed to save the trees from almost complete defoliation. The tent caterpillars are about an inch and a half in length, and are dull in color, and covered with short hairs. The head is bluish grey. They spin webs in the branches of trees, in which they live, devouring the foliage with great voracity, so that if they are numerous the trees are stripped as if in winter. When mature, they spin long oval cocoons, not altogether unlike those of the silkworm, to which they are somewhat allied. From these come dull brown stout-bodied moths, which will be recognised by their hairiness, and their feather-like antennæ. The eggs are laid close together in rings or bracelets round twigs and small branches, and from each batch of eggs there issues a colony of caterpil-

lars, which live gregariously in their tent-like web before mentioned.

The apple tree generally suffers most from the tent caterpillars. In Utah, much damage is reported to apple, apricot, plum and currant in Salt Lake and Utah counties, some of the orchards being described as looking as if stripped by fire. The pear and peach trees suffered no damage.

Again, Mr. James Fletcher, in his report an Entomologist to the Canadian Government for 1887 writes. "These caterpillars have appeared in great abundance all over Canada during the past season, and seem to attack the foliage of almost every kind of deciduous tree." In British Columbia similar damage was done, but it is to be noted that the eastern and western caterpillar belong to different, though allied species. The best remedy to be employed for these pests is to search for and destroy all egg-masses, which are quite easily seen, or after the eggs have hatched to remove the caterpillars in their webs, and destroy them. Paris Green may also be sprinkled over the foliage where they feed, if they are very numerous.

The species to which our Custer county tent caterpillar belongs is not yet precisely ascertained; possibly we have more than one. Moths of the genus Clisiocampa were found commonly by Swift Creek in 1887, and one of them, being sent to Mr. Henry Edwards, was identified as Clisiocampa californica, which is the parent of what is known as the western tent caterpillar. In June 1888, we sent a tent caterpillar to the Agricultural Department at Washington, and Mr. L. O. Howard wrote concerning it, "Your larva of Clisiocampa or Populus, is evidently not californica, as we have a good series of the latter species with which your larva has been compared. Your larva comes near one which we have received from Utah, but which has not yet been bred." And later, a moth being sent, was referred doubtfully to Clisiocampa incurva.

The tent caterpillar has an enemy in Custer county in a species of solitary wasp, scientifically named Ammophila robusta. One of these was observed dragging a full grown caterpillar which was bigger than itself; the wasp had destroyed its consciousness without killing it and was taking it as provender for its young. The way in which the wasp contrives to have her meat fresh for the infant maggot is graphically described by Sir John Lubbock. To prevent the inconvenience of struggling meat on one hand, or decomposing meat on the other, the mother-wasp performs very skilfully an elaborate surgical operation demanding accurate knowledge of the anatomy of the nervous system of caterpillars, which consists of a series of ganglia, a pair at each segment, and connected together by commissures running down the length of the body. The first step of the wasp surgery is to pierce the membrane between the head and first segment of the body and to sting the brain like ganglia of the head. This probably acts like the administration

of chloroform, and destroys the consciousness of the caterpillar. But as every segment has a separate motor-center, the caterpillar still kicks and struggles automatically, and therefore the wasp perforates and paralyzes each pair of segmental ganglia, thus rendering the caterpillar quiescent and insensible without killing it, that it may keep fresh for the wasp maggot until entirely devoured.

It is important to distinguish the tent caterpillar from the Cottonwood web-worm, of which we shall probably have something to say later on. This latter is much lighter in color, and the head is not grey. It spins extensive webs on the cottonwoods in eastern Custer county, and Fremont and Pueblo counties.

THE BUTTERFLIES OF COLORADO.

Nathalis iole.—A little pale yellow buttefly, which cannot be mistaken for any other, because it is so small, being not much more than an inch across the wings. The tips of the fore wings are black, and there is a black patch near their lower margins; the hind wings are mostly yellow in the male, but shaded with dusky in the female, while in both sexes the portion of the hind wings overlapped by the fore wings is mostly occupied by a broad dash of black. In the males there is on this dash of black a much elongated spot, which is extremely interesting because of its peculiarities and our ignorance of its purpose, unless it be an ornamentation of the male for the delectation of the other sex. This spot is in some specimens pale yellow, while in others it is orange, yet these latter, if killed and kept in the cabinet, do not retain their orange spot; sooner or later it fades suddenly away, and becomes pale yellow, as it is in some specimens from the beginning. We supposed at first that all examples of Nathalis iole had this orange spot when alive, but we find this is not so, having obtained a variety in which the spot was yellow when the insect was caught. Therefore we have apparently an orange spotted form, which we will call aureomaculata, evolving from a probably more primitive yellow spotted type, flavomaculata; but the new combination of pigment, whatever it is, is not yet fixed, and will even break up suddenly into the old form long after the insect's death.

Nathalis iole is at present only known to us in Colorado from two counties, Custer and Pueblo, but doubtless it will be discovered in others in course of time.

NOTES.

All observant people must have seen the yellow spiders that sit on yellow flowers, and white spiders that sit on white flowers, and catch bees and other insects which visit the flowers not noticing their enemies because of their deceptive coloring. These spiders live on their looks, and never go to the trouble of spinning any web. According to Mr. James Angus, the white and yellow spiders are the same species, and change color, chameleon-like, according to the flower they find themselves on. We shall make experiments to test this statement when the summer comes round.

Interesting Entomological specimens sometimes come to visit us on our imported fruits. At Westcliffe, we found the caterpillar of the cod-

ling moth (Carpocapsa pomonella) snugly buried in the depths of an apple, looking like a little pink maggot; and on a lemon exposed for sale was a whole colony of the oyster shell lemon louse, (Mytilaspis citricola.) These insects are protected by a scale like covering, shaped in the manner of an elongated oyster shell. Although termed "lemon lice," they are really allied to the well known Cochineal insect of commerce.

Recently, in the "West American Scientist," we described a new variety of lupin found by Mrs. M. E. Cusack in Wet Mountain valley. By some accident it was described under Lupinus argenteus, but it is really a form of L. parviflorus, and its correct title is Lupinus parviflorus var. sericea.

Mr. H. Strecker writes us that Smerinthus myops has been found at Denver. This fine moth has apparently not hitherto been recorded from Colorado. We have a different species of the same genus, Smerinthus astarte, in Custer county.

It was so warm the other day up by Short Creek, that small insects of the genus Proconia were hopping about in great numbers.

When the snow is melting, myriads of minute creatures are often seen upon its surface, which hop about continually. They are called skip-tails, and belong to the order Thysanura. They are perhaps identical with the Anchorutes nivicola, which is described as living on snow.

T. D. A. C.

CUSTER COUNTY COURANT, JAN. 2, 1889.

FIFTH REPORT

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(25.) W. S. Foster, Salida, Colo.

(26.) Dr. Geo. H. Horn, Philadelphia, Pennsylvania.

THE FOSSILS OF HUERFANO COUNTY.

In 1887, while strolling over some of the lower foot-hills of the Greenhorn Range in Huerfano county, I came upon a small patch of Sedimentary Formation which upon examination proved to be highly fossiliferous, and in a few hours I secured a large quantity of well preserved fossil univalve shells of the family Aviculidæ, also a number of most beautifully preserved teeth, so perfect that the enamel glistened as if the original owner and they had but yesterday parted company. There also was still not only the enamel but the delicate serrations still standing out on each of some of the teeth like the little sharp points of a very fine toothed saw. Then there were also with these cutting rasping teeth the molars all perfect as the day when with surgical dexterity they probed and rasped the fleshy parts of creatures that fell to them as fit and proper subjects of vivisection. Some of these teeth were small, others a little over an inch in length; some of them were laying on the ground exposed, others were to be chiseled out of the solid rock, which consisted of an impure limestone containing a large quantity of siliceous matter. There were along with these teeth scattered fragments of the beautiful Ammonite shell, whose graceful whorls have often been in other parts of the world amongst the uninformed regarded as certain confirmatory evidence that St. Patrick did really destroy the snakes of Hibernia—and behold these are they now changed to stone.

Be that as it may, here in the beautiful low lands of the Greenhorn range may be found the self-same so-called petrified snakes, not however in so good a state of preservation as I have seen them elsewhere. I need scarcely say that these Ammonite shells are simply the preserved inhabitants of an ancient sea. They belong to the Nautilus family (Cephalopoda) of the present day, but they themselves have been blotted out of natures catalogue of the living ages and ages ago. There is also well preserved the beautiful Pecten shells (family Pectinidæ,) whose delicate lines of ornamentation are still retained; and more which are much less familiar than they, and who seem strangers even to those who have made the science of Conchology

a study. How strange it seems that right out here in the Rockies, midway between the seas, the remains of creatures once endowed with life, and which could only live in ocean depths, should be found. Have they wandered(with us) this far from the sea, or has the sea wandered so far from them? Ages ago, during what is now known by Geologists as the Cretaceous Period, the ocean, or at least a part of it, covered what is now the eastern portion of the Greenhorn range of mountains. But instead of mountains it was then the bottom of an extensive sea, whose billows rolled and whose waters ebbed and flowed even as now. But not to give life and vigor to a dense mountain woodland, but to give life and spirit to a brisk marine population.

T. CHARLTON.

(To be continued.)

INJURIOUS INSECTS OF CUSTER COUNTY.

The Colorado Cabbage Flea beetle (Phyllotreta albionica)—This is a long name for a very little beetle, not much bigger than a flea, and it is because of its small size, and vigorous hopping, that it has received the name of "flea-beetle." A similar beetle, which infests the turnip, has been for ages known in Europe and dreaded as the "turnip-flea," while there are are two other cabbage flea-beetles known in America, called respectively the wavy-striped flea-beetle and Zimmermann's flea-beetle. The Colorado flea-beetle is of a uniform deep-polished, olive-green color, and this readily distinguishes it from the wavy-striped and Zimmermann's species, both of which are marked with a band of pale yellow on each wing-cover. Although known to exist in western Custer county, reports have not yet been received of damage done here by this insect, but without doubt the cabbages and other allied plants have suffered and will suffer from the flea-beetle, although in the past the depredator himself appears to have been generally unrecognized. The U. S. Entomologist, in his report for 1884, writes thus of the Colorado flea-beetle: "Another flea-beetle injurious to cabbage and other cruciferous plants, is common in June and July throughout the Rocky Mountain region of Colorado, having been found in great numbers at the very highest elevations." He goes on to state that the early stages of this beetle are not known, but probably the larvæ are small yellowish-white maggots, feeding upon the roots of cabbages and turnips. As it is very desirable to ascertain the true history of the early stages of the Colorado flea beetle, as well as the amount of its ravages both in the larval and perfect states, we would ask those who grow cabbage, turnip, mustard or radish next summer to note whether the beetles are present, and whether they gnaw innumerable

small pits in the surface of the leaves, and most of all whether young plants are ever killed by small maggots eating at their roots, or whether, on the other hand, maggots are found mining the leaves of Cruciferous plants, as is the habit of some flea-beetles in the larval stage.

With regard to remedies for this beetle, it will be time to enlarge upon this subject when we hear more precise information of its ravages, but we may mention that dusting with ashes, or the application of Pyrethrum powder would probably meet with some measure of success, as it has in the case of other flea beetles.

Two other injurious beetles of the same family (Chrysomelidæ) are found in Colorado; one of them is the well-known Colorada potato-beetle (Leptinotarsa decemlineata,) which has not been met with in Custer county, and is apparently quite rare in Colorado, doing no damage compared to that caused by it in some of the more eastern states. The Colorado potato-beetle cannot be confounded with the flea-beetle, being very much larger, and dull yellowish with ten black stripes. The other injurious beetle of this family is known as Graptodera foliacea, and is found in Wet Mountain valley. This last resembles the flea-beetle of the cabbage, but is larger, and could not be mistaken for it by anyone familiar with both. It has done much damage to apple trees near Denver, and we shall therefore describe it in full in some future report.

We hear from Dr. Geo. H. Horn that he is now studying these beetles monographically, so we shall be glad of specimens of any of the flea-beetles (Halticidæ) to send to him. He has already been good enough to examine and report on some beetles of this family for us.

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CUSTER COUNTY COURANT, Jan. 9, 1889.

C. V. RILEY.

P.C. 30a/4

FIFTH REPORT

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(25.) W. S. Foster, Salida, Colo.

(26.) Dr. Geo. H. Horn, Philadelphia, Pennsylvania.

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CUSTER COUNTY COURANT, Jan. 9, 1889.

SIXTH REPORT

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(27.) John Burke, Westcliffe, Colo.

THE LIBRARY.

Our thanks are due to Prof. Riley for his report as Entomologist to the Department of Agriculture for 1887, and to Mr. C. F. Morrison for several odd numbers of "West American Scientist" and other magazines.

THISTLE INSECTS.

In Custer county, and probably throughout Colorado, the thistle is one of the less-noxous weeds, owing to its comparitive rarity. Yet there are some thistles everywhere, and it is not at once evident why these plants should multiply at snch an alarming rate in Canada, the Eastern states and Europe, while our peculiar species of thistle is by some unknown power kept within something like reasonable bounds. There must be a reason why the thistles do not multiply—let us investigate, and see what it is. Let us go in to the field early in July; here are some thistles, they are just coming into bud. Examine them closely, and you find a number of flies, not more than one on each bud. They seem busy about something; are laying their eggs in the thistle buds. We will call them the Thistle-bud fly, their scientific name is Scriptotricha culta. These flies are dull yellowish, with many short, stiff bristles; their eyes are dark and iridescent. But we can always know them by their wings, which are warm yellowish-brown, except the broad transparent margin, which is divided by numerous dark bars, and the numerous transparent circles in the brown portion, each one of them edged with blackish. There is also a black spot on each wing near the end.

We go again to the thistles in September, and examine the buds: most of them are dead and brown, never producing seed. Some have flowered, and the seeds are already failing away, carried over the field by their feathery pappus, parachute like. What then is the matter with all these dead thistle-heads? We pick some, and pull them to pieces—there is no seed, something has eaten out the core, it is the maggot which came from the eggs of our Thistle-bud fly. We collect a number of withered heads, and in due time the perfect flies emerge—the progeny of those we found in July.

Now supposing there were no Thistle-bud fly, and the land was overrun with thistles, what should we not have to say in praise of anything that would rid us of them? So perhaps we owe some gratitude to this little fly, which has worked so quietly that most of us have not noticed it, but has spared us even the trouble of thinking how to

get rid of the thistles.

In Canada, there is also a Thistle-fly, belonging to the same family as ours (Trypetacæ). This destroys the imported field thistle, but is itself destroyed in such large numbers by a parasite that it seems unable to keep the thistles down like our fly. From over 200 larvæ of the Canadian thistle-fly, collected by Mr. James Fletcher, only two flies were bred, all the rest were destroyed by a small black parasite, named Solenotus fletcheri. We believe that our fly also suffers from the attack of a parasite, but not to such an extent as the Canadian fly; our only evidence in the matter being that a brilliant green parasite fly is often found on the thistles infected by the Thistle-bud fly, but whether it is parasitic on that or some other insect in its early stages we do not know.

We have also the thistle butterfly (Pyrameis cardui.) whose spiny caterpillars may often be found on thistles, spinning a sort of web. It is curious that a spiny plant should have spiny caterpillars on it—and what is still more curious, according to Buckler, some of these caterpillars which were feeding on a mallow, which has no spines, developed hairs; although at the same time they were not without their spines, having no doubt inherited these from thistle-feeding ancestors. The thistle-butterfly is about two inches across the wings, and is marked with black and fulvous, the latter with a pinkish tinge. There are also some white markings near the apex on the front wings, and other markings which we shall describe in full perhaps in a subsequent article specially devoted to this butterfly. This butterfly is found in almost every part of the world, and sometimes occurs in vast numbers. In 1885 they were exceedingly abundant in Canada and Massachusetts, and in 1879 we observed myriads of them in the south of England.

There are other thistle-infesting insects of which we may have something to say another time. One of the most noticeable is a pretty red weevil, called Rhynchites bicolor, which we found on a thistle near Ula; but this is also found on other plants.

Besides these insects there is a fungus found on thistle near Ula, called Puccinia suaveolens. We found both uredo and teleutospores, and sent specimens to Mr. I. B. Ellis, who wrote, "The uredo is common here (Newfield, New Jersey) but I have never seen the teleutospores before."

NOTES.

We hear that the sheep-herders in Glove Canon, near Rush Creek, Pueblo county, have recently suffered from mountain lions, which have been quite destructive among the sheep. Golden eagles have also appeared, and have attacted the young lambs. Poison was accordingly laid down, and a mountain lion and three eagles were killed; one of the latter measured

en feet six inches across the wings, from tip to tip, (not 8 ft. 6 inches, as a Pueblo paper had it.)

We shall be very glad of information as to the distribution of the mountain lion (Felis concolor) in Colorado. At present we have received reports of it from only nine counties, namely Delta, La Plata, Routt, Pueblo, Custer, Fremont, Gunnison, Eagle and Summit.

In 1887 we found a curious yellow fungus growing on a dead tree at Wellsville, in Fremont county, and afterwards sent specimens to Dr. W. G. Farlow, who wrote concerning it: "The only name I can now give to it is Corticium setosum, Berk. & Curt. That is the name given to it in the authentic collection of Curtis, although I believe the description was never published. As a matter of fact the fungus is not really a Corticium, but it seems to me rather an imperfect fungus, and I am inclined to regard it as a degenerate condition possibly of some Myxomycete." The only genuine Corticium we have so far met with in Colorado, is one on Quaking Asp bark in western Custer county, which Mr. I. B. Ellis says is probably C. populinum.

Early in April last year, while walking near Swift creek, we came across a specimen of the common round cactus (Cereus viridiflorus) which appeared dead or dying, and on removing it from the ground we found it quite hollow, and tenanted by a large beetle-larva, pale yellowish in color, with curiously bifid dorsal tubercles. We sent this destroyer of cacti alive to Dr. Riley, who replied that it was an extremely good specimen, and evidently the larva of Cactophagus validus.

On the 8th of last March we found a large cocoon, about two inches long, on a Bigelovia plant near Ula. It was silky grey, exactly the color of the Bigelovia stalks, and so hard to distinguish, notwithstanding its size, that we did not know what it was until we had it in our hand. On the 18th of June, a grand moth emerged from this cocoon. Its name is Samia gloveri. In Utah, where it is quite common, the caterpillar feeds on currant and gooseberry, but there were none of these near where we got our cocoon, nor have we been able to find any cocoons on currant or gooseberry bushes here.

About the middle of April last year the butterflies began to fly in western Custer county. One we caught proved to be Pieris sisymbri, a butterfly which has generally been regarded as belonging only to the Pacific slope.

Mr. W. S. Foster, writing from Salida, says that P. sisymbri is also common in his locality in the early spring.

Mr. H. W. Nash writes us that a pigmy owl (Glaucidium passerinum californicum) was killed near Pueblo recently.

In 1887 we found two butterflies in northern Summit county, which were

identified at the U. S. National mu seum as Colias chrysomelas and Phyciodes orseis. These two species have not hitherto been known to exist in Colorado, and additional specimens from this state are much required. Another butterfly imperfectly known to us is from Riverside, Chaffee county, August 16th, 1887. It is a Chrysophanus or "Copper butterfly," and Mr. Henry Edwards, who now has the specimen, says it is like Mariposa, but is not that, and looks like a new species. We have called it C. canyonum, but do not describe it as the specimen we sent to Mr. Edwards is too imperfect, and we have no other. It is peculiar for having brown spots bordered with whitish on the under side of the hind wings.

Mr. H. W. Nash, of Pueblo, has kindly undertaken to work up the butterflies of Colorado for the C. B. A. He will be glad of notes and specimens from every county, especially those in the extreme eastern and western parts of the state.

T. D. A. C.

CUSTER COUNTY COURANT, JAN. 16, 1889.

SEVENTH REPORT.

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(28.) J. Jenner Weir, F. Z. S. &c., Chirbury, Beckenham, Kent, England.

(29.) J. B. Ellis, Newfield, New Jersey.

(30.) Prof. A. S. Packard, M. D., Providence, Rhode Island.

(31.) Prof. Byron D. Halsted, Agricultural College, Ames, Iowa.

THE FOSSILS OF HUERFANO COUNTY.

(Continued from fifth report.)

It was during this period in the world's history that these creatures now found entombed in the rocks of which we have just spoken, were possessed of vitality. They lived and had their being in that far-off day, as similar creatures do at the present time. These sharp-pointed teeth now isolated and fossilised, bristled then in the huge, hungry jaws of giant sharks, some of which were of enormous size. They with hungry greed darted here and there in this primitive sea in search of food, and in consequence of their great strength proclaimed themselves terrors to their less favored contempraries. Truly "there were giants in those days" and no anti-vivisection society had so far made its appearance to curb the cruel inclinations of creatures disposed to shed innocent blood. The tendency of nature has ever been to give preference to th the coarse and brutal elements of organic forms; ever as with us to-day has the weakest gone to the wall, while the violent and offensive have been victorious in the great struggle for existence. The upward march of all organism from the lowest Protozoa on through all the Geological ages until the culmination of life in man, has been accomplished by violence and bloodshed. And there never has been a time since living forms first appeared on this earth of ours when disease and death and pain and suffering, war and bloodshed were unknown. The race was ever to the swift, and the battle to the strong.

It was now the beautiful Ammonite drifted before the ocean breeze reflecting with its nacreous surface all the gorgeous colors of the sunbeam, or sunk itself beneath the deep blue ocean wave in quest of food or pleasure suitable to its lowly nature.

These are but a few, very few, of the creatures that lived in this far off period of the world's history. Millions of millions of these creatures were of microscopic dimensions and their tiny skeletons constitute great beds of chalk to-day. The microscope has revealed the fact that the great bulk of our chalk and limestone formations is almost entirely made up of the shells of foraminifera the most of which are in-

visible to the naked eye. There is as much truth as poetry in the lines of Byron, "The very dust we tread upon was once alive." These creatures lived and died just as their representatives do to-day. And we find that after the rush and hush of life is past the carcass of each one on mother ocean's bed. Then nature as if greiving the extinction of that flame that cannnt be re lit, quietly and steadily covers the remains from sight. Dust to dust and ashes to ashes, was spoken by nature ages before man was born to speak at all. T. C.

With regard to nature's preference for the "coarse and brutal elements," we are unable to share the opinion of our contributor, and would point out that whereas most of the larger vertebrate types of past ages have become extinct, it is only the minute forms, such as the foraminifera, which have survived unchanged to the present day. These, by no stretch of imagination, can be termed "coarse and brutal!" If we may state our own opinion, it has always seemed to us that the struggle for existence so far from being synonymous with "violence and bloodshed," was rather the reverse in its broader aspects, and that those organisms succeeded which were most in harmony with their environment and had least necessity for doing violence to their contemporaries. In the case of the sharks and the small fish, if the swiftest and strongest sharks survive because they are better able to catch their prey, it is also plain that the fish which can most easily escape them will also survive, and in the long run their relative positions wilt not be materially altered. So that whatever skill the sharks acquire in catching fish, they will always have the same difficulty in obtaining food, and specialization in other directions will be almost impossible. Ed.

INJURIOUS INSECTS OF CUSTER COUNTY.

The large flat headed pine-borer, (Chalcophora virginiensis.)—This is the larva of a fine beetle which is occasionally found near Swift creek, at the lower edge of the pine timber. The larva we have not met with, but according to Packard, it is a flat-headed, white grub, which bores into the sap-wood of pines, girdling the trees. The track of the grub begins as a narrow and shallow groove on the surface of the wood, which is irregularly wavy, and gradually increases as the larva grows, ending in a large hole where it becomes a pupa, from which the perfect beetle emerges in due time. The beetle is an inch or more in length, oblong in shape, and in color brassy, at first sight looking almost black. The under side of the body is sparingly covered with short whitish down. We have two other pine beetles in western Custer county, called Criocephalus agrestis and Rhagium lineatum. The latter is the most common, and forms part of the insect food which Nuthatches may be seen

seeking so diligently as they run up and about the trunks of pine trees. We ascertained this by finding a fragment of Rhagium in the stomach of a slender billed Nuthatch. Hylotrupes bajulus is also found in western Custer county, we met with one example, which was identified by Dr. John Hamilton. Packard classes this among the insects injurious to the pine, and says (Bull. 7, U. S. Ent. Comm.) that it is supposed to have been introduced into this country from Europe, and is found in America only on the sea coast. This, however, is evidently not so, since we have it occurring here in the very heart of the continent, at 8,400 feet elevation, and very far from the sea.

NOTES.

With regard to Jack Rabbits, Dr. C. H. Merriam writes writes that we have probably twy species in Colorado, Lepus campestris, which has a white tail, and turns white in winter, and Lepus texianus, which has the upper part of the tail black, and does not turn white in winter. We have seen plenty of L. campestris in western Custer county, but are not sure about the other. Will any one who may have seen L. texianus please report the fact to us.

Many species of animals are infested with intestinal worms. We found numbers of one of these worms, called Sclerostomum tetracanthum, in the intestines of a horse which died of aneurism up on Swift creek last year, and the year before last a porcupine (Erethizon epixanthus) killed on Blue River, in Summit county, was found to be infested with tape-worms.

Last April ten cattle died suddenly in Wet Mountain valley, with every appearance of Splenic fever. This most swift and fatal disease is caused by a microscopical rod-like organism called Bacillus anthracis, which is found in the blood of the diseased animals. These organisms retain their vitality after the death of the animal, and will renew their activity if by any chance they get into the system of another. Hence it is of the greatest importance to utterly destroy the bodies of animals which die of Anthrax.

Experiments have hitherto failed to discover the poison in loco, although we strongly suspect that an alkaloid is present in the root or young leaves of the plant, which will be discovered by patient research. Prof. W. S. Gee dosed five of his students with preparations of loco for nearly three weeks, to see what effect it would have on them. (We do not hear that the learned professor took any himself.) From the first, an infinity of symptoms were noted, but happily it seems that loco poisoning was not among them. A writer in the "Bulletin of the Torrey Botanical Club" took in one dose more than all the above-mentioned students took in the course of the entire three weeks, but experienced only a slight nausea, due to the unpleas-

ant taste of the plant.

We hear from Dr. John Hamilton that he is preparing a catalogue of the American beetles which are also found in Europe or Asia. There are, he says, over five hundred of such species. This catalogue will be of great interest to Colorado Coleopterists, as we have quite a large number of species common to the Old World.

In the "West American Scientist" for November (published January) we have defined three varieties of Calochortus gunnisoni. which we obtatned near Swift creek, in Custer county, a locality in which this beautiful lily-like flower is quite common. The first variety, described as "imaculatus," should be "maculatus." The bulb of Calochortus is frequently destroyed by a number of orange colored maggots, which feed upon it.

T. D. A. C.

CUSTER COUNTY COURANT, JAN. 23, 1889.

EIGHTH REPORT

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(32.) Dennis Gale, Gold Hill, Colorado.

(33.) Dr. C. H. Merriam, Ornithologist and Mammalogist to the U. S. Department of Agriculture, Washington, D. C.

(34.) I. Parker Norris, Editor of Oological Department of "Ornithologist and Oologist," 723 Walnut Street, Philadelphia, Pennsylvania.

THE LIBRARY.

Through the kindness of Prof. Packard, we have received a copy of Bulletin 7 of the U. S. Entomological Commission, relating to insects injurious to forest and shade trees; and also notes on "Bot-fly maggots in a turtle's neck," and "Larvæ of a fly in a hot spring in Colorado," both reprinted from "American Naturalist," July, 1882. We have also to acknowledge with thanks the receipt of "Journal of Mycology" for 1887, from Mr. J. B. Ellis.

SNAILS AND SLUGS.

Are there any snails and slugs in Colorado? Probably if this question were asked of all the people in the state, at least half of them would reply without hesitation "no." Yet we have about fifty kinds of snails in Colorado, and one species of slug-the last presenting three varieties. Most of them are small, and dull in color, and that is why they have been overlooked.

The ground is frozen and covered with snow now, and we can hardly find any snails; but let us anticipate events, and imagine it is summer, and that we are starting out to look for snails. We start from Westcliffe, and go toward Grape creek, down the steep path near the mill. At the bottom of the path is a swamp, and here a barrel full of water, which we examine closely. Here is something in the water, sticking to the side of the barrel, and here another, and another—they are water-snails. Not much to look at, at first sight; dull brownish, pointed at the apex—but here is something unusual, the mouth of the shell is on the left, and we know, or ought th know, that nearly all shells twist round to the right instead. It is by the sinistral turn of these water-snails that we know their genus, they belong to the genus Physa, their full name being Physa heterostropha, of which they are a small variety. Except in the rarest cases, all those water-snails whose shells turn to the left belong to the genus Physa, no exceptions to this rule are known in Colorado. Leaving the Physæ, we go on a little further, to a swamp about a hundred yards away, and look on the stems of grasses and other plants.

Very soon, more snails are found, but they are not like the ones in the barrel. In the first place, they do not live in the water, and then they have their mouths turned to the right, and altogether opener and with a smaller spire (as the upper part of the shell is called) than our water-snails. Besides, they are pale horn color, and not so large, and notice particularly, that the animal cannot retire quite into its shell and out of sight, however much it would like to do so, on seeing that you are so rudely staring at it. Minding these characteristics, we are able to tell its name. It is Succinea pfeifferi; called Succinea because it is semi-transparent like amber, and pfeifferi after a celebrated European Conchologist, Pfeiffer, who wrote a great book on snails.

Having obtained specimens of both Physa and Succinea, we walk down Grape creek, until we come to where the Ula road crosses it. This does not look a promising place for snails, but here is some refuse thrown up by the creek, little bits of stick, and all sorts of odds and ends; we will examine it. Very soon we find some shells, empty of their inhabitants, and not in very good condition, but still recognisable. Here is Succinea pfeifferi, that we have already found, and here another shell, something like it, but darker in color, and with the spire larger in proportion—this is called Succinea avara. Then we have another dark colored shell, not half an inch long, with a longer spire than any Succinea, and an oval mouth—this is Limnæa truncatula, a kind of water-snail. If we had it alive and compared it with Succinea, we should see that the tentacles are broad and flattened, whereas in Succinea (of which we have found living specimens) they are long and cilindrical, and bear eyes at their extremities. In the refuse we have also found three small snails that are flat, and two that are long and cylindrical, though very minute, and two other little things that are actually shaped like clams, having two valves joined together at the hinge—if we are fortunate enough to find some in which the valves have not already been broken apart. These little bivalves lived in the creek, no doubt. They belong to the genus Pisidium, and are much alike, only that one of them, Pisidium pusillum, is round oval, while the other, P. variabile, inclines to be triangular. Now we must look at the land-snails. Three kinds are flat, and the largest is only about a quarter of an inch across. This larger kind is blackish and dull, if examined with a lens it is seen to be covered with fine transverse striations, quite ornamenting its dull surface. It is the little striated snail, Patula striatella. The next in size is brown and polished, and thus we know its genus, for these little polished species are called Hyalina. We examine it carefully, and find very many fine rays or striations striking out from

the suture between the whorls, and this determines it to be the species Hyalina radiatula. The third is still smaller, scarcely an eighth of an inch across, but we can easily tell it from the others by its white color, and the thick white rim round the mouth of the shell, called the lip. This is Helix pulchella: in Canada, this snail is found smooth and shiny, but our specimens are delicately ribbed all over, and are therefore called variety costata. There are still two kinds to be examined, which are dark brown, and cylindrical, at a glance you would think they were seeds. They belong to the genus Pupa, but are not in good condition, and we will not try to name them until we have found better specimens.

So much for the refuse thrown up by Grape creek. Now we will cross over the creek, and walk down the lane until we get near John Burke's. Now if we are not terrified by the ferocious looking animals he keeps to guard his mansion, we search in the ditch on the left hand side of the road. Soon we find some water-snails, and they are Physæ, too, because their shells twist to the left; but they are narrow and tapering, and a livelier brown, evidently not the same as the species from the water barrel. In fact, they are Physa hypnorum, and rather larger and longer than is usual with specimens of that species. Now we have collected enough for to day. We have not been two miles from town, and yet we have found twelve kinds of snails. So there are some snails in Colorado after all!

NOTES.

With regard to the Colorado cabbage flea beetle, of which we gave an account in our fifth report, Dr. Horn writes that although this has been called Phyllotreta albionica, it is not the true species of that name, but another which he calls P. pusilla. Dr. Horn does not think the true P. albionica is found in Colorado.

Mr. Vernon Bailey, writing in the report of the Commissioner of Agriculture for 1887, says he believes skunks to be beneficial, because they feed almost entirely upon insects.

In our first report we gave the description of a new beetle (Longitarsus nitidellus,) in which we stated that the antennæ were nine-jointed. We have now sent the specimen to Dr. Horn, and he reports that they are really eleven jointed. We have only ourselves to blame for the mistake, which arose through our using too low a magnifying power.

We found a large puff-ball in Wet Mountain valley last year, and sent the specimen to Mr. J. B. Ellis, who replies that it "must be Mycenastrum corium. Your specimen is more pointed than others I have seen from your region, but the capillitium and spores are the same, only the threads of the capillitium are not quite as spiny."

We are indebted to Dr. Riley for

the identification of three species of Diptera, or two-winged flies, which were obtained in western Custer county. They are Eristalis hirtus. Melanostoma cærulescens and Dejeania vexatrix. The last, which is new to our Colorado list, was discovered by Mr. Jim Splaun.

Near Willow creek we found a large Quaking asp extensively honeycombed by some insect, and on sending pieces to Dr. Riley, are informed that the damage was done by a species of white ant, called Termes flavipes. The white ants belong to the group called Platyptera, and have nothing to do with the common brown ants.

Two lizards which we found by Plateau creek, near Eagalite, Mesa county, on September 19th, 1887, have been identified for us at the U. S. National Museum as the Ornate Uta (Uta ornata) and the six lined lizard (Cnemidophorus sexlineatus.)

T. D. A. C.

CUSTER COUNTY COURANT, JAN. 30, 1889.

NINTH REPORT.

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

THE LIBRARY.

It is our pleasant duty to acknowledge several valuable contributions to the library, namely the magnificent "Monograph of the Geometrid moths," by Prof. A. S. Packard, from the author; "A generic Synopsis of the Fulgoridæ," by Wm. H. Ashmead, from the author; and from Mr. Wm. Otto Emerson two papers entitled "Birds and Eggs from the Farallon Is.," by W. E. Bryant, and "Ornithological observations in San Diego county, California, by W. O. Emerson.

NEW MEMBERS.

(35.) Frank B. Webster, Editor of "Ornithologist and Oologist," 409 Washington street, Boston, Massachusetts.

(36.) T. M. Trippe, C. E., Silverton, Colorado.

(37.) D. W. Park, 620 27th street, Denver, Colorado.

(38.) Geo. Roberts, Lofthouse, near Wakefield, England.

(39.) A. E. Lomax, 56 Vauxhall Road, Liverpool, England.

OUR SPRING MIGRANTS.

On the 31st of January, we saw a flock of Wax-wings on the trees by Willow creek; last year they came a few days earlier, namely January 26th: The bluebirds ought to be here now—has nobody observed them? and then will follow the whole train of immigrant birds, the last to arrive being in all probability the night-hawk.

Will members of the Association and others kindly keep a look out for these spring arrivals, and let us know the dates of earliest appearance? We want to know all about the migration of birds in Colorado, and can only do so with your help.

From our diary of last year we take some notes; these all refer to western Custer county. The dates of arrival may be interesting to compare with this year.

Jan. 26th, 1888:—By Swift creek, this morning, we hear many voices, saying "Che-e-e, Che-e-e." It is a flock of about a hundred wax-wings, they sit on the tops of the quaking-asps, and never cease their cry; they are pretty birds, with their crested heads, and varied colors, black, grey, brown and reddish.

Feb. 1st.—Here are the bluebirds, a flock of them, the first seen this year.

Feb. 3d.—A little brown bird cries "Cheet, Cheet" in a brush by the stream, we cannot tell what it is. Robins are reported to have been seen.

Feb. 26th.—Saw a Robin, the first we have seen this year.

March 11th.—Robins are now quite common.

March 19th.—A flock of Red-winged Blackbirds seen by Short creek. "Chw, Cr-h-e-e-r," is their cry.

March 31st.—At 7:15 a. m., something is tapping on the roof of the house. We go out to look—it is a red-shafted flicker,

the first seen this year.

April 4th.—The western meadow-larks have come, and pour forth their melodious notes as they sit on the fences about Ula. Their eastern relative has no such beautiful song. The red-winged blackbirds are now quite common.

April 7th.—We examined the stomachs of some birds, to see what they had eaten. A wax-wing had dined on beetles of the family Geodephaga, a bluebird had partaken of ants and a beetle called Graphops varians, and in the stomach of a robin were seeds and beetles (Geodephaga.) But a blue-jay was the thief, he had stolen the wheat thrown out to feed the chickens.

April 9th.—The red-shafted flickers are now common.

May 6th.—A mourning dove was seen, the first of the year.

May 11th.—Mourning doves (Zenaidura macroura) are now becoming common. Brewers blackbird (Scolecophagus cyanocephalus) has become quite common.

May 14th.—The first swallow (Chelidon erythrogaster) seen.

May 15th.—Saw eggs of robin and blue jay.

May 22nd.—The first humming bird of the year has come.

May 24th.—Humming birds are now quite common.

May 31st.—Found a nest of Brewer's blackbird, with eggs. This was on the ground, although N. S. Goss ("Birds of Kansas") gives this birds as nesting "in the forks of trees and bushes, from three to thirty feet from the ground." But Mr. C. F. Morrison found them nesting on the ground in La Plata county.

June 4th.—At last the night-hawks have appeared.

MEETING.

The Custer county division of the C. B. A. held a meeting at the Westcliffe School House on Tuesday, January 29th, at 8 p. m. Including non-members, the attendance was 26. Mr. S. Wright took the chair. Mr. T. Charlton, who was to have spoken on chemistry, was prevented from doing so by illness. The Secretary, acting in his place, showed the tests for salts of iron, copper and lead, and demonstrated by means of the Sulphuric acid test that the substance imported in tin cans from Kansas City, and sold as pure lard, is not that substance, but some other compound. The Secretary then read a paper on "The Balance of Nature," referring chiefly to insects and their parasites. The paper was illustrated by five large colored diagrams, representing (1.) Thalessa ovopositing in a tree stump. (2.) An Ichneumon of the genus Ophion. (3.) Caterpillar of Telea polyphemus. (4.) A beetle (Megilla maculata) with the cocoon of its parasite. (5.) A spider with a parasitic larva (Polysphincta) upon it. It dealt first with the unfortunate results of importing animals to new countries, as for instance the rabbit in Australia and New Zealand, without considering beforehand their habits and the probability of their doing damage. With regard to insects, perhaps the chief reason that noxious species increased so rapidly in new countries was that

their parasites were generally not imported with them. Nature, left to herself, preserved a balance between the different forms of life, that could not be upset with impunity. The case of the European cabbage-butterfly (Pieris rapæ) was a case in point, in Europe it was kept greatly in check by a minute parasitic four winged fly, but this enemy being absent in America, until recently imported by the government, the cabbage-butterfly had increased enormously and become very harmful. Another similar instance was that of the Cottony-cushion scale (Icerya purchasi) in California. Quite recently, however, the parasite of this insect hac been sent to California by a government agent who had been dispatched to Australia, its native home, for the purpose of procuring it, and it was hoped that it would increase and do much good in checking the increase of that terrible pest the Icerya. The manner in which the large Ichneumon (Thalessa) deposited its eggs was described, and also the parasitism of Ichneumons and Tachina-flies upon caterpillars, and the way in which lady-birds and spiders were destroyed by parasites. Various other matters wers also referred to; the parasites of Sawflies, egg-parasites, and the destruction of thistles by the thistle-bud fly.

NOTES.

We sent the wings of three ducks, shot in the Costilla county part of the San Luis valley, to Dr. C. H. Merriam. He says they are the Red Duck (Erismatura rubida,) the Buffle-head (Charitonetta albeola,) and the Gadwall (Anas strepera.) The Gadwall is also found in western Custer county.

Dr. Merriam identifies the Mountain rat, which is so troublesome in western Custer county from about 8,400 to 10,000 feet altitude, as Neotoma cinerea. He has a number of specimens from Boulder county.

Menopon pallidum is the name of a chicken louse, which is sometimes found upon chickens in western Custer county. There is also a chicken flea—we have seen these sitting in rows, twenty or thirty together, on the cracks in a fowl-house which was very rarely cleaned out

Although there are many species of spiders in Custer county, we have only been able to get one kind named. This is called Azalena nævia, and was identified by the Rev. O. P. Cambridge. Comparitively little is known at present about spiders, and doubtless many of our species are undescribed.

In 1887 we found some minute shells in Delta county, on the south side of the Grand Mesa, which differed somewhat from anything we had seen, and we were therefore proposing to call them Pisidium mesæ. However, after comparing them with numerous examples of P. pusillum, we are persuaded that they represent only a form of that polymorphic species.

A kind of liverwort, called Marchantia polymorpha, is exceedingly abundant on the banks of streams on the east slope of the Sangre de Cristo range, in in Custer county. Fifteen species of liverworts have been found in Colorado.

T. D. A. C.

TENTH REPORT.

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(40.) Dr. R. W. Shufeldt, Smithsonian Institution, Washington, D. C.; and Fort Wingate, New Mexico.

THE VIOLETS OF CUSTER COUNTY.

Everyone is fond of violets, and is interested to know where they are found; nor need I, in describing the violets of Custer county, say what distinguishes violets from other plants, they are familiar to all. We have found in this county five species of the genus Viola, all of them near Swift creek—because our researches have been almost entirely in that neighborhood: we shall give the precise locality where we found them, hoping that those who find them elsewhere will send us word. First of all, we have the yellow-flowered violet (Viola nuttallii) more properly a heartsease, named after Nuttall, a naturalist who collected in Colorado very many years ago. There can be no mistaking this, as it has yellow flowers; it grows on a sunny sand bank just where the road to the upper part of Swift creek strikes the prairie: its roots striking down very deeply. We found it first in flower on the 6th of May.

Next, there is the white violet (Viola canadensis,) with conspicuous white flowers on a tall slender leaf bearing stalk, often a foot high. The leaves are heart shaped, serrate, and pointed. The flowers are often tinged with purple beneath, and a variety is described in which they are entirely purple, but we have never met with this ourselves, and do not think it occurs in Custer county. The white violet grows under the quaking-asps by the side of Swift creek, and also on bare ground about the head of short creek, always selecting shady places.

The remaining three have purple flowers, but are quite easily distinguished by the character of its leaves. The first is the dog-violet, (Viola canina var sylvestris,) with heart shaped leaves on a stalk, as in the white violet, only the dog-violet is not so large and more trailing than that, besides having different colored flowers. It is found about the head of Texas creek, and probably up to a high altitude in the mountains. Viola cucullata is another purple flowered violet, more resembling the sweet-violet, and easily known from the dog-violet from the fact that the leaves and flowers spring from the ground, instead of from a common stalk. It grows in clumps rather in the open—quite abundantly by Swift creek, and sparingly by the side of the road near John Burke's. A variety has been found with white flowers, but not yet in Custer county; should it be discovered it will be distinguished from the white violet by the leaves springing from the ground. Lastly, the cut-leaved violet (Viola delphinifolia) cannot be mistaken for any other, because its leaves are cut and divided, so as to have something the appearance of anemone leaves.

The flowers are purple. This violet grows in open ground by Willow creek. These are all the violets yet known from Custer county, two others are found in Colorado, and may yet be met with here. One, Viola palustris, or the marsh violet, grows like V. cucullata, and has round heart-shaped leaves, but the flowers are small, and in color pale lilac with purple streaks. The other, Viola biflora, the two-flowered violet, has a stem with two leaves and two flowers on it. The leaves are kidney shaped and the flowers are very small and yellow.

The caterpillars of the Fritillary butterflies (Argynnis) feed on violets. These caterpillars are spiny, and turn to large brown butterflies with silver spots on the under side of the lower wings. We have five species of those butterflies in western Custer county; one, Argynnis cypris, we found by Short creek, and the other four were taken by Mr. Nash at Music Pass. Their names are A. eurynome, A. helena, A. eleta and A. hesperis.

NOTES.

On February 13th we noticed that the loco had already begun to sprout in western Custer county. A few days before, we saw some horses busy on a loco patch.

A selection of the fossils from Huerfano county, described in our fifth and seventh reports, has been sent to the U. S. National museum, where some of the shells have been kindly identified by Mr. C. A. White as follows: Ostrea blackii, white; Ostrea, sp; Inoceramus barabini, Morton; Lunatia concinna, H. & M.; and Anchura? fusiformis, meek.

We have found another kind of scale-louse on imported lemons, this time in a store in Silver Cliff. These lice are circular in outline, and have been identified by Prof. C. V. Riley as Aspidiotus nerii. This species is figured and described in the Annual Report of the U. S. Department of Agricultural for 1880.

Mr. Wm. Ashmead is now preparing a list of the Hymenoptera (Bees, wasps, ichneumons &c.) of Colorado, which it is hoped may be published before very long. He writes "It will be quite extensive, amounting to several hundred species." Of these, many are undescribed, as for instance eight new species in a small collection we sent him recently, which are to be named as follows: Menodontomerus, montivagus, Epyris monticola, Microplitis fuscipennis, Macrocentrus montivagus, Adelura montana, Hopleseis flavinotatus, Stigmus coloradensis and Megacilissa monticola. Full details concerning these will be given in the list.

Mr. C. F. Morrison has promised to edit Ornithological reports of the C. B. A., which will appear each month in "Ornitholigist and Oologist." He will be glad if members will send him notes about the occurrence of birds, their food-habits, migration, nesting, and so forth, for incorporation in these reports. He will also be glad of specimens of bird skins, nests, or eggs, to form a nucleus for a future museum of the C. B. A. Mr. I. P. Norris will also be glad to receive eggs of Colorado birds, and has kindly promised to prepare for us descriptions of such as are interesting. He has sent us a list of the Colorado birds of which the eggs are unknown or imper-

fectly known, which we shall publish soon.

Mr. L. Bruner ispreparing an account of the Orthoptera (locusts, grasshoppers, crickets, etc.) of Colorado for the C. B. A., and will be glad to receive specimens of these insects. In all cases the locality where captured should be precisely stated when sending in specimens. Mr. Bruner has already examined and named about 27 kinds of grasshoppers from Custer county.

Has anyone seen any blue birds yet? We are pretty sure we heard one by Short creek as early as Feb. 3. They came on Feb. 1st last year.

The supposed Urocerus which we found last summer at Cottonwood Springs, Pueblo county, parasitised by Thalessa, as recorded in "Entomologist," December, 1888, proves to be a new species of Tremex. In a supplementary paper we are preparing we shall describe it as Tremex hospes.

We have been overhauling our flies of the genus Gonia by the light of Dr. Williston's paper in "Canadian Entomologist," 1887. Among the western Custer county specimens is one of G. frontosa with the thorax and abdomen almost entirely black, the striping and banding of the type being practically obsolete; we shall call it var. ater. We have also two species belonging to the Exul group. One may be a form of G. exul, the other would seem to be new. A fourth species, from Dillon, looks like a Gonia, but probably belongs to a distinct genus.

T. D. A. C.

ELEVENTH REPORT.

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(41.) Dr. John M. Coulter, Wabash College, Crawfordsville, Indiana.

(42.) Dr. George Vasey, U. S. Department of Agriculture, Washington, D. C.

(43.) Willoughby P. Lowe, Box 829, Pueblo, Colorado.

(44.) Rev. C. J. S. Bethune, Editor "Canadian Entomoligist," Port Hope, Ontario, Canada.

(45.) C. F. Ancey, Fort National, Algeria.

A LOCAL HERBARIUM.

That a country so large and populous as the state of Colorado should possess no museum of Natural History, wherein examples of its animals and plants are displayed for examination and study, is little short of a disgrace. There is, indeed, a small collection of animals and birds exhibited to the public in Denver, but it is ill-arranged and mostly unlabeled (or was so when we examined it in 1887.) and is not, we understand, due to any labors on the part of Colorado Naturalists. For practical purposes it is almost worthless. We have also heard of the private museum belonging to Mr. Carter, of Breckenridge, and we believe Mr. Aiken has specimens on exhibition at Colorado Springs, but these taxidermists' museums cannot take the place of a public institution, nor are they likely to afford us very much help. Of course, whenever the people of this state are sufficiently alive to the necessity of supporting such an institution, it is the purpose of the C. B. A. to establish a museum which shall be as nearly as possible all that can be desired, but in the meantime private collections are being made by some of the members, and as these are very fairly representative of certain districts, it will not be amiss to call attention to them.

During the last few days we have been making an examination of the herbarium of Mrs. M. E. Cusack, which was formed last year, and is a very fair representation of the flowering plants of Wet Mountain valley. Collections were made in Custer county by Brandegee many years ago, and the species recorded in Porter and Coulter's "Flora of Colorado." Recently, we have recorded a number of species from Custer county in various periodicals, and these, with Brandegee's records, seem to embrace all that has been made known respecting the flora of this county. It will therefore be easily supposed that the herbarium in question, due to the botanical industry of Mrs. Cusack, contains a large number of species new to the county flora, and some few not hitherto recorded to the state.

The specimens are carefully mounted, and handy for reference, except some orders, such as the grasses, which have not yet been classfied.

To commence with the Ranunculaceæ, we notice first the purple Clematis (C. douglasii,) which grows abundantly in open ground on the grassy slopes at the base of the mountains. It is unlike anything else, but we have also its variety rosea, the flowers of which have dull pink taking the place of purple—and the example of the variety is decidedly more wooly than that representing the type. Then we have the lilac tinged Anemone (A. patens var. nuttalliana,) the first flower of spring, which affords so plentiful a feast to the early bees, clustering on its golden anthers. The flowers of this plant appear before the leaves, thus reversing the order of things in most other plants. The genus Ranuculus—the buttercups, is represented by three species. R. cymbalaria expands its small yellow flowers in great abundance in damp places by the roadside near Ula, it is the only common buttercup in the valley. Another nearly similar kind, but taller and having the stem-leaves deeply divided, comes from the neighborhood of Beckwith mountain; it is called Ranuculus rhomboideus. The third is an aquatic plant, with finely divided leaves, and white flowers, and so far has not been found in the valley, although it is known in Custer county. The example of this (R. aquatilis var. trichophyllus) is from the Hardscrabble. Two plants bearing spikes of conspicuous blue flowers, superficially not unlike, are the monkshood (Aconitum columbianum) and the larkspur (Delphinium scopulorum.) Both of these are abundant near Swift creek. A white flowered marsh marigold (Caltha leptosepala) is found near creeks and ditches, it is said to be an excellent po-herb, but we never tested its qualities in this direction. Finally, there is a beautiful exumple of the blue columbine (Aquilegia cærulea,) which is so abundant high up on the slopes of the Sangre de Cristo range; and a specimen of the red and yellow columbine (A. canadensis.) This last came from near Buena Vista, and was obtained by Mr. F. W. Cusack, but Mrs. Cusack tells me she found the same species some years ago near Colony creek, in our county.

NOTES.

Probably the number af animals known to exist in Colorado is not half of those yet to be discovered, but it will doubtless surprise many to know how large a number have already been found. The books of the C. B. A., up to January Ist, 1889, contain records of the following, all found in the state: Mammals, forty and five varieties; Birds, 315 and 47 varieties; Reptiles, 4; Fishes, 2; Molusca (snails and slugs) 56 and 11 vaieties; Coleoptera (beetles,) 476 and 12 varieties; Neuroptera and Trichoptera, (dragon flies, caddis flies etc.) 29; Hymenoptera, (ants, bees, wasps, ichneumons etc.,) 53; Orthoptera (grasshoppers and crickets,) 108 and one variety; Butteflies, 186 and 27 varieties; Moths, 573 and 4 varieties; Thysanura, 1; Homoptera (plant lice etc.,) 23; Diptera (two winged flies,) 55; Heteroptera (plant bugs,) 23; Arachnida (spiders etd.,) 34; Myrispoda (centipedes,) 1; Crustacea (freshwater shrimps etc.,) 10; Annelida

(leeches etc.,) 7 and one variety; Nematoscolices, 1. There are also many species which have long ago become extinct, and their fossil remains now attest their former existence; of fossils we have records of 77 Mammals; one bird; 28 Reptiles; 2 Fishes; 25 Mollusca; 2 Homoptera; and one each of Coleoptera, Neuroptera, Hymenoptera, Orthoptera, Rhopalocera, Diptera and Echinodermata.

The plants recorded in our books for Colorado are also very numerous, namely Flowering plants, 1370 and 164 varieties; Gymnosperms (pines, firs etc.,) 15 and 2 varieties; Ferns and their allies, 32 and one variety; Mosses, 112 and 8 varieties; Hepaticæ (liverworts,) 15; Fungi, 70 and one variety; Lichens, 65 and two varieties; Algæ, 31. We have also records of several kinds of fossil plants: Flowering plants, 124 and 4 varieties; Gymnosperms, 6; Pteridophyta and Characeæ, 23; Algæ, 4; and Fungi, 1.

Mr. C. F. Ancey has examined some snails which we collected in western Custer county, and sends us his notes on them. One species of Pupa he says appears to be P. hebes, and another is what he has recently described as P. ingersolli. Specimens of Vallonia he considers to belong to an undescribed species, which he calls cyclophorella, but we prefer to consider them a form of costata at present. Examples of Physa, which we shall call P. heterostropha var. heterostrophella, he thinks probably represent a new species. They were found at Westcliffe.

T. D. A. C.

TWELFTH REPORT.

Of the Colorado Biological Association.

EDITED BY THE SECRETARY.

NEW MEMBERS.

(46.) Miss K. Hemery, Bedford Park, Chiswick, England.

(47.) Mrs. A. E. Cockerell, Bedford Park, Chiswick, England.

SIGNS OF SPRING.

In our ninth report we gave the dates of arrival of the various migratory birds, as observed in 1888. We now enumerate some of the phenomena observed last year in Wet Mountain valley,—signs that spring was upon us. We hope we may rely on our readers to furnish us with similar data this year.

Jan. 27. Very warm; found a caterpillar crawling on the snow.

Feb. 29. The flies are on the wing—blow-flies and gnats.

March 10. The chipmunks have come from hybernation, and are running about.

March 12. Very warm and sunny; found many beetles.

March 13. Saw the first butterfly of the year, a Vanessa milbertii out from hybernation. It is a fact known to comparatively few people, that certain butterflies live as butterflies in a dormant state all the winter through, and this accounts for their appearance in the warm days of early spring.

March 16. Found a horned-toad,—or properly speaking, horned lizard.

March 17. Found two moths near Willow creek, called Alucita hexadactyla and Ufeus satyricus.

March 22. Saw another butterfly, this time a willow-butterfly or "camberwell beauty" (Vanessa antiopa). The prairie dogs are out and about, and are said to have been so for some time, but we did not see them.

March 23. Anemonies are sprouting.

March 25. Thunder heard for the first time this year.

March 30. Found some beetles, Cymindis planipennis etc. Saw a Vanessa antiopa.

March 31. The Anemonies (A. patens var nuttalliana) are in bud.

April 1. The Anemonies are in flower, the first and perhaps the most lovely blossoms of the year. Large red caterpillars of a Cossus moth are crawling about.

April 2. Ploughing commenced on Swift creek. (Probably earlier elsewhere; will ranchmen kindly inform us the dates at which they first plough, sow, plant and gather in the harvest? We shall value such information highly.)

April 4. Found Cymopterus montanus in flower near Ula. It is the first flower of the year. Modest enough in appearance it is, but the cattle are so fond of it that there was hardly a good specimen left for us.

April 5. Caught two tiger beetles, (Cicindela), and a species of ant (Formica integra).

April 6. The light of a lamp is a great

attraction for moths; we tried it this evening, and got Calocampa cineritia, and other things.

April 7. The first rain of the year fell.

April 15. The first spring-emerging butterflies seen (Pieris),also saw a Grapta. The small gentian, Gentiana humilis, in flower.

April 22. The willows are in bloom.

April 23. Saw a milkweed butterfly, Danais plexippus.

April 24. Kinni-kinnick (Arctostaphylos uva-ursi) in bloom.

April 25. Clematis douglasii, Euphorbia montana and Lencocrinum montanum in flower.

April 28. Snow about a foot this morning, but rapidly melting. This was an unusually late fall to be so deep.

May 2. Berberis and Quaking-asp in flower.

May 16. Rose-fly (Rhodites tuberculator) emerging from the galls. Found a mushroom.

May 22. Found a morel (morchella esculenta) by Swift creek. This fungus is edible, and is much esteemed in parts of Europe.

A FRUIT-EATING BEETLE.

Last August, not very far from Beulah, in Pueblo county, Mrs. M. E. Cusack found two beetles feasting on the flower head of a thistle, and kindly gave us the specimens. They belong to the family of rose beetles, and live mostly on flowers, and are fond of all sweet things. In shape, they are broad and rounded, and often they are of most brilliant colors. The species we now write of is dull in appearance, but if examined closely is not without beauty, the wing cases being dull brownish yellow on the back, with numerous small black spots, producing a marbled appearance. The thorax is beautifully smooth, being covered with short dull yellowish hairs. Its name is Euryomia inda. Often this beetle is injurious to fruits, as stated by Mr. W. Saunders, who says: "They attack our finest and most luscious fruits, eating their way into the richest ripening pears and burrowing into the finest peaches so deeply that only the tips of their bodies are visible, and in this way spoiling the fruit and inducing rapid decay. They also attack grapes and other sweet fruits." We have found a second kind of rose-beetle, called Trichius piger on a wild rose by Swift creek, in Custer county, but this does not do any damage.

NOTES.

In our 7th report we described the pine-boring beetle Chalcophora, but stated that we had not met with the larvæ. On the 25th of last month, however, we found one of these grubs in a burrow in a pitch-pine stump. It is dull ochre in color, and 46 millimetres long.

Apropos of A. G. Tansley's article on the colors of leaves and flowers in the last issue of "Science Gossip," Miss A. S. Fenn, of Isleworth, England, sends us the following interesting observations: "I have often meant to ask you whether you have ever noticed that in gooseberry bushes which bear yellow gooseberries, the leaves turn yellow in autumn, and in those which bear red berries, the

leaves turn red. I ha[illegible]ced this, and wondered whether the[illegible]as any reason for it. Another observation of mine, of which this article reminds me, is that at different periods of the year, there is generally a predominant color among the wild flowers, or so it seemed to me at Ewhurst. For instance, first, I think comes a yellow period—primroses, lesser celandine, tussilago, etc. Then a purple or lilac period—wistaria, lilac, purple orchids, cuckoo-pints, and others. Next, a red period—ragged-robin, rose, campion, geranium. I am not quite sure where the others come, but I think the year winds up with yellow again. Does this seem to you mere fancy? Of course there are always other colors at the same time, but in fewer numbers."

Mr. W. S. Foster sends us a very interesting list of butterflies and moths found by himself last summer Marshall Pass, at 10,000 to 13,000 feet altitude. They were taken on the north side of the track, on the slopes of the main divide and Mt. Ouray, and the list includes 33 species, among which are the following.- Papilio zolicaon, Colias alexandra, C.scudderi, C. eurytheme, Meltœa brucei, M. anicia, Erebia magdalena, Chrysophanus snowi, Deilephila lineata, Alypia lorquinii, Nemeophila plantaginis, and Botis turmalis.

With regard to the two species of melitæa, we hear from Mr. W. H. Edwards that Mr. H. Edwards examined Doubleday's type of anicia at the British museum last summer, "and says brucei is the real anicia. Every one of us have been in error these 25 years, taking a certain Nevada species, lately called M. McGlashanii by Prof. Rivers, to be the true anicia."

Dr. Geo. H. Horn writes about a beetle of the genus Phœdon we sent him from western Custer County. The "Phœdon has long been in my cabinet without a name, as I am reasonably sure that our species need comparison with those of Europe." The species is very near, if not the same as P. tumidulum, which we have taken in England, at Ilseworth, and other localities.

The fauna of Washington County is almost unknown, and we shall be very glad to hear from anyone who has collected there. In July, 1887 we found a beetle called Chrysomela disrupta, two kinds of ants, and a grasshopper—apparently Melanoplus flavidus, all at Pinneo. These are the only insects we have seen from this County.

Mr. W. S. Foster has taken that rare and interesting moth, Gloveria arizonensis, at Salida, and has obtained eggs from a female specimen. Unfortunately, though, "the larvæ all died for want of proper food. If you know the food plant I would be very glad to know it,for I will very probably have more eggs next season as they lay freely." So writes Mr. Foster—can any of our members make a suggestion? We suggested willow.

Mr. Foster, referring to matters mentioned in our 4th and 6th reports, says he has taken Nathalis iole at Denver and Salida, and Smerinthus myops and

Samia gloveri at Salida. Of the latter he says "I raised a brood on a species of thorn (Cratœgus), and have now about 30 cocoons."

From Mr. Nash we learn that Samia gloveri is found at Rosita, Pueblo, Canon City, so it is evidently quite widely distributed in this region.

Dr. Hamil[illegible]nds an undescribed Anthobium among some beetles from western Custer County, and a moth from near Wales Canon, Pueblo county, is con sidered by Prof. Packard to be a probably new species of Tolype.

T. D. A. C.